1. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-5 + 4i \text{ and } 4$$

   A. $b \in [5, 14], c \in [-1, 5],$ and $d \in [-165, -162]$

   B. $b \in [-2, 4], c \in [-1, 5],$ and $d \in [-22, -18]$

   C. $b \in [-2, 4], c \in [-10, -7],$ and $d \in [11, 20]$

   D. $b \in [-12, -3], c \in [-1, 5],$ and $d \in [164, 169]$

   E. None of the above.

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2. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.
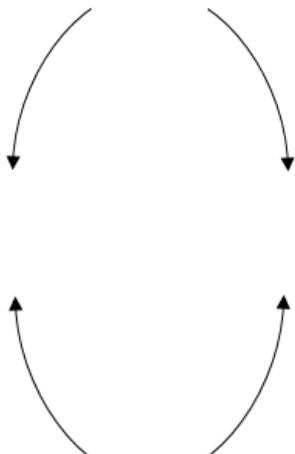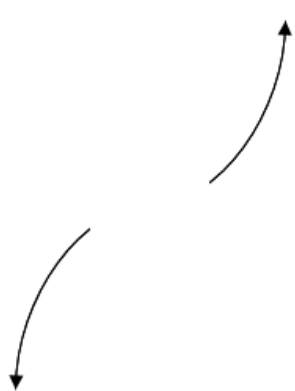
$$\frac{7}{4}, 5, \text{ and } \frac{7}{3}$$

   A. $a \in [12, 14], b \in [-112, -107], c \in [293, 297],$ and $d \in [245, 252]$

   B. $a \in [12, 14], b \in [-76, -65], c \in [-15, -8],$ and $d \in [245, 252]$

   C. $a \in [12, 14], b \in [108, 115], c \in [293, 297],$ and $d \in [245, 252]$

   D. $a \in [12, 14], b \in [-112, -107], c \in [293, 297],$ and $d \in [-246, -240]$

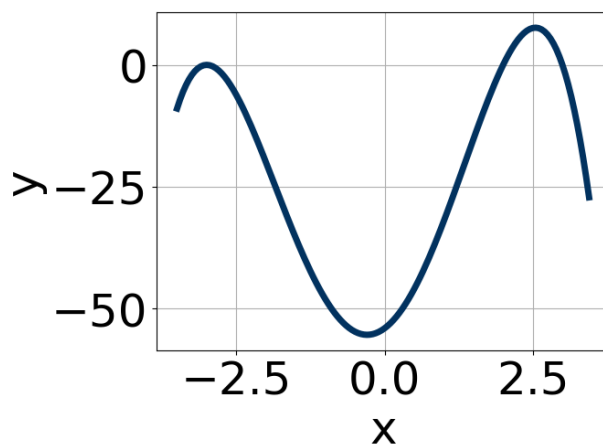   E. $a \in [12, 14], b \in [49, 58], c \in [-88, -83],$ and $d \in [-246, -240]$

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3. Describe the end behavior of the polynomial below.

$$f(x) = -5(x + 3)^4(x - 3)^5(x + 2)^3(x - 2)^5$$

B.

D.

C.

E. None of the above.

4. Which of the following equations *could* be of the graph presented below?

A. $18(x+3)^{10}(x-3)^9(x-2)^7$

B. $-5(x+3)^6(x-3)^5(x-2)^9$

C. $4(x+3)^4(x-3)^9(x-2)^4$

D. $-16(x+3)^5(x-3)^8(x-2)^7$

E. $-13(x+3)^{10}(x-3)^8(x-2)^{11}$

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5. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{-1}{2}, \frac{5}{4}, \text{ and } \frac{7}{5}$$

A. $a \in [35, 45], b \in [-86, -81], c \in [16, 18], \text{ and } d \in [32, 42]$

B. $a \in [35, 45], b \in [-128, -124], c \in [121, 126], \text{ and } d \in [-38, -33]$

C. $a \in [35, 45], b \in [-33, -17], c \in [-75, -64], \text{ and } d \in [32, 42]$

D. $a \in [35, 45], b \in [-86, -81], c \in [16, 18], \text{ and } d \in [-38, -33]$

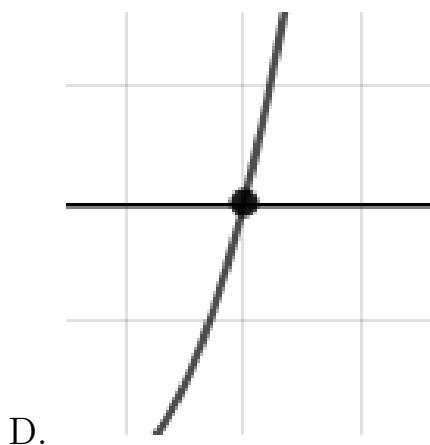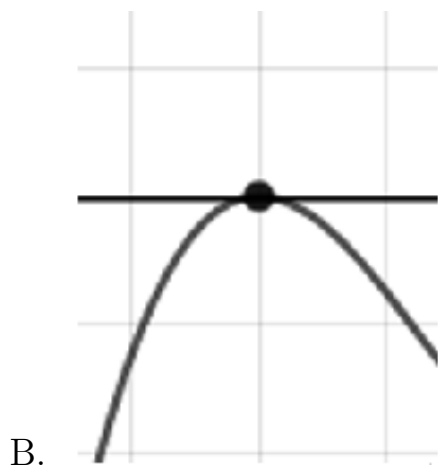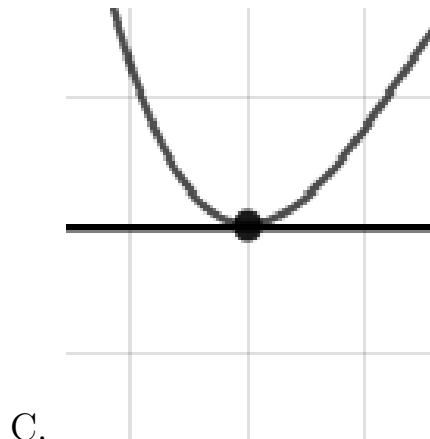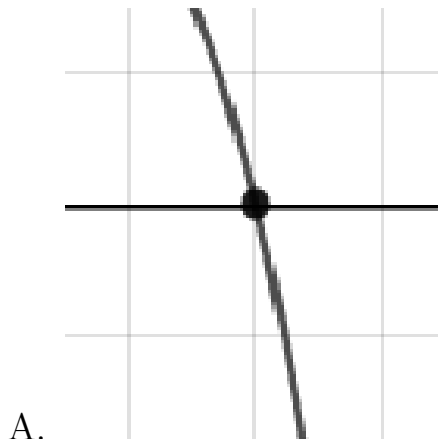E. $a \in [35, 45], b \in [81, 94], c \in [16, 18], \text{ and } d \in [-38, -33]$

6. Which of the following equations *could* be of the graph presented below?
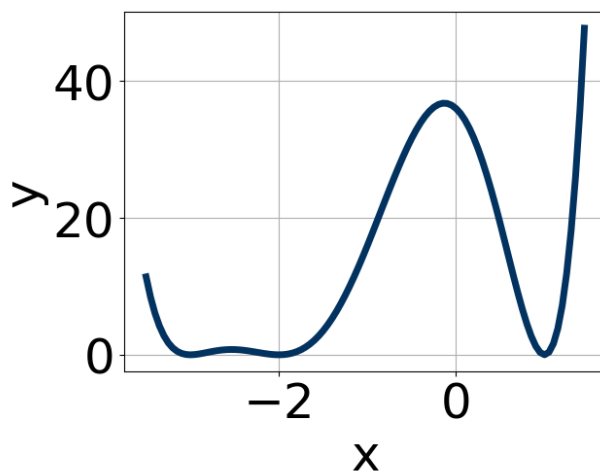
A. $8(x + 2)^8(x + 3)^6(x - 1)^6$

B. $-12(x + 2)^4(x + 3)^8(x - 1)^{10}$

C. $10(x + 2)^6(x + 3)^6(x - 1)^5$

D. $-13(x + 2)^{10}(x + 3)^8(x - 1)^9$

E. $19(x + 2)^{10}(x + 3)^{11}(x - 1)^9$

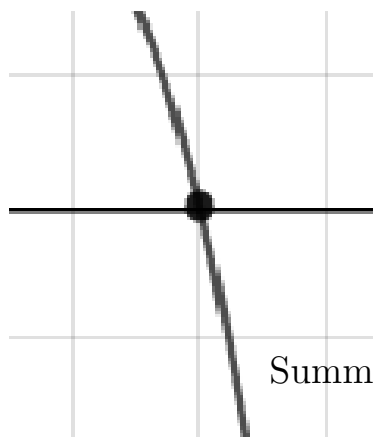7. Describe the zero behavior of the zero $x = 3$ of the polynomial below.

$$f(x) = -2(x-2)^6(x+2)^3(x+3)^{11}(x-3)^6$$

A.

C.

B.

D.

E. None of the above.

8. Describe the zero behavior of the zero $x = 2$ of the polynomial below.

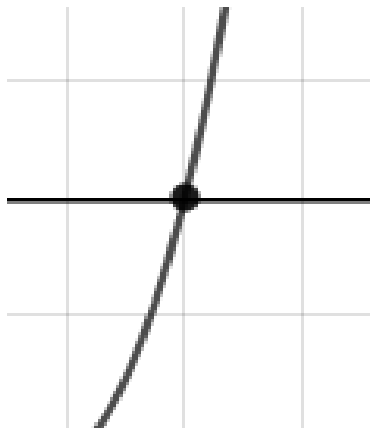$$f(x) = -2(x-2)^2(x+2)^7(x+9)^4(x-9)^8$$
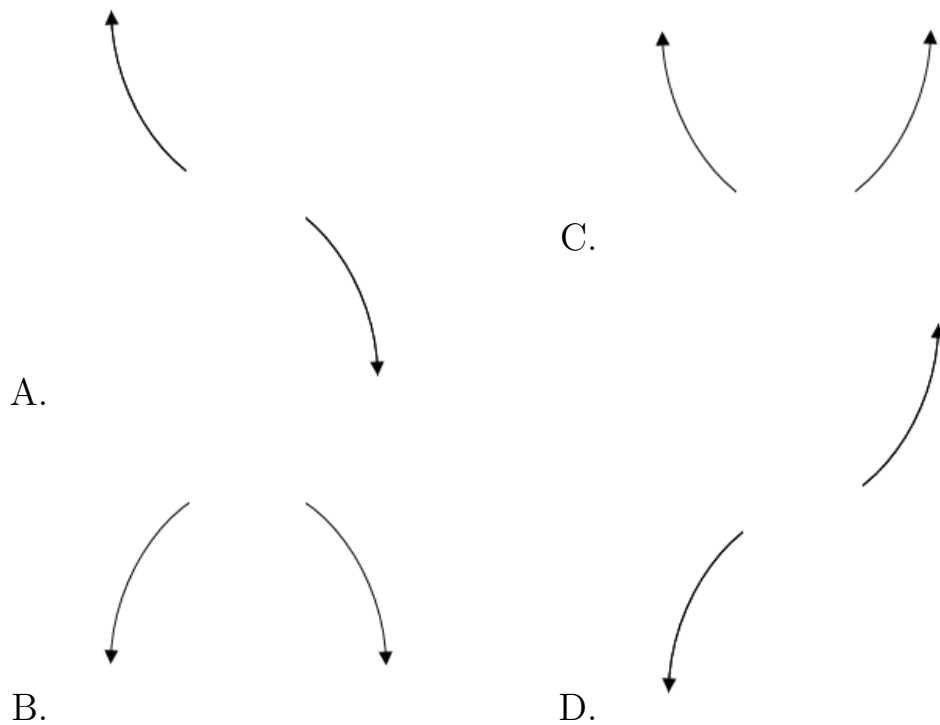
A.

B.

C.

D.

E. None of the above.

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9. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-2 + 2i \text{ and } 1$$

A. $b \in [-3.8, -1.5], c \in [2.1, 5.2],$ and $d \in [6.4, 9.3]$

B. $b \in [0.7, 2.7], c \in [-3.6, -0.8],$ and $d \in [0.3, 4.3]$

C. $b \in [2, 4.5], c \in [2.1, 5.2],$ and $d \in [-8.4, -7.4]$

D. $b \in [0.7, 2.7], c \in [-0.3, 2.5],$ and $d \in [-4.2, -1.1]$

E. None of the above.

10. Describe the end behavior of the polynomial below.

$$f(x) = 6(x+3)^3(x-3)^6(x-2)^5(x+2)^6$$

A.

B.

C.

D.

E. None of the above.